

REMARKS

Claims 1, 3-11, and 13-23 are pending. Claims 2, 12, and 44-70 are temporarily withdrawn as being directed to a non-elected species, but pursuant to PTO rules will automatically re-enter the application should generic claims be allowed.

I. Rejections Over the Prior Art:

In responding to the Examiner's prior art rejections, Applicant here only justifies the patentability of the pending independent claims (1 and 11). As the Examiner will appreciate, should these independent claims be patentable over the prior art, narrower dependent claims would also necessarily be patentable. Accordingly, Applicant does not separately discuss the patentability of the dependent claims, although it reserves the right to do so at a later time if necessary.

Claim 1 has been rejected as anticipated (35 U.S.C. § 102(b) by USP 6,007,671 ("Fujimura").

Claims 1 and 11 have been rejected as obvious (35 U.S.C. § 103) by USP 6,538,734 ("Powell") in view of Fujimura.

Fujimura:

The Examiner has misinterpreted Fujimura's disclosure. Fujimura discloses a "hydrogen plasma down-flow processing method." Col. 3, ll. 30. By this, it is meant a plasma process in which a workpiece is positioned in the down-stream flow of the plasma. See Col. 3, ll. 38-39 (noting that the "processing object [i.e., the workpiece] is processed on the down-flow side of the plasma."). Thus, and referring to Figure 1—the Figure cited by the Examiner in support of rejection of the claims—the workpiece being processed in Fujimura would appear on the right side

("vacuum") of that drawing.¹ This is verified by other embodiments, such as that shown in Figure 4, which shows the workpiece 14 in the down-stream flow of the plasma. Claim 1 also makes clear that the workpiece appear on the vacuum side of tube 1. See Claim 1: "processing an object at down-flow area of the hydrogen plasma in the vacuum chamber."

When the location of the workpiece in Fujimura is understood, it is clear that Fujimura does not anticipate claim 1. In fact, several limitations in claim 1 are not disclosed in Fujimura's Figure 1. Those missing limitations are highlighted below:

1. A plasma chamber coupleable to a processing chamber for assisting in the analysis of at least one processing gas for performing a process on a workpiece in a processing chamber, comprising:
 - a processing gas inlet port coupleable to the processing chamber for receiving the at least one processing gas from the processing chamber, wherein the processing gas was used to process a workpiece in the processing chamber;*
 - at least one reference gas inlet port for receiving at least one reference gas from at least one reference gas source, *wherein the reference gas does not pass through the processing chamber;*
 - a cavity for receiving the at least one processing gas and the at least one reference gas; and
 - an energy source for exciting the at least one processing gas and the at least one reference gas to form a plasma.

The Examiner in his analysis of Fujimura does not explain where the "processing gas inlet port" can be found in Figure 1, but presumably the Examiner believes this port to comprise the left opening of the tube 1, i.e., where "H₂" hydrogen gas is input into the tube. But this hydrogen gas is what is used to etch the workpiece coupled down-stream to the right edge of the tube. See, e.g., col. 1, ll. 24-55 (discussing the use of hydrogen plasmas to etch native oxides on semiconductor workpieces).

¹ In this regard, note that Figure 1, unlike Figure 4 for example, is not a full plasma down flow processing apparatus, and thus does not show the workpiece being etched. Instead, Figure 1 shows a subset of a full processing system, and specifically shows those the portion for "studying interaction between quartz and hydrogen." Col. 4, ll. 36-37.

When this is understood, it is clear that Fujimura does not disclose “a processing gas inlet port coupleable to the processing chamber for receiving the at least one processing gas from the processing chamber, wherein the processing gas was used to process a workpiece in the processing chamber.” First, the right edge of Fujimura’s tube 1 is not coupleable to a processing chamber having a workpiece; instead it couples to a receptacle that provides the hydrogen etchant gas, which receptacle of course is not a chamber which holds or processes the workpiece as claimed. Second, Fujimura’s hydrogen gas “was not used to process a workpiece in the processing chamber”; instead it is “fresh” hydrogen gas that has not yet been used in the processing of the workpiece.

Fujimura further does not meet the limitation that “the reference gas does not pass through the processing chamber.” The Examiner believes that water (labeled as “H₂O” in Figure 1) comprises the claimed “reference gas.” Assuming this to be true for the moment,¹ it is clearly the case that this water will be carried from left to right through the tube 1, and hence will ultimately pass to where the workpiece is located. Because claim 1 specifies that the workpiece is located in a processing chamber, this means that the water must pass through the processing chamber. Indeed, improved etching of the workpiece is the entire reason that water is provided. See Col. 2, ll. 32-45 (discussing the benefits of adding water to the etching plasma). Therefore, it is clear that this water in Fujimura is specifically intended to come into contact with the workpiece, and hence that the limitation that “the reference gas does not pass through the processing chamber” is not met by Fujimura.

For these reasons, it is clear that Fujimura does not anticipate claim 1, or any claims dependent thereon.

¹ Despite the Examiner’s citation to portions of Fujimura for the disclosure of actinometry, it is never disclosed in Fujimura that water is used as an actinometric gas.

Powell:

Applicant explained in the last office action response that Powell did not disclose or suggest the limitation that “the reference gas does not pass through the processing chamber,” a limitation present in both of independent claims 1 and 11. Because the Examiner has dropped this basis for rejection, he apparently agrees with the Applicant on this point.

This same limitation is also not present in Fujimura, as just described above. Because this limitation is not disclosed or suggested in either Powell or Fujimura, even when taken in combination these references in combination cannot render claims 1 and 11, or claims dependent thereon, obvious. See MPEP § 2143.03.

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Based on the above remarks, Applicant respectfully submits that the pending claims are allowable, and requests that a Notice of Allowance issue for these claims and for all claims that currently stand as withdrawn.

Respectfully submitted,

/ TGL /

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